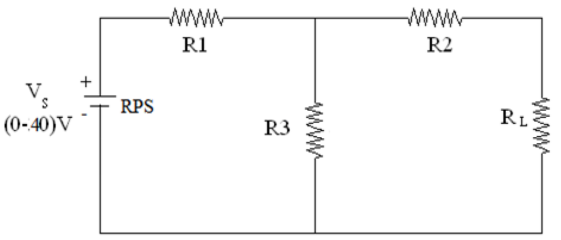
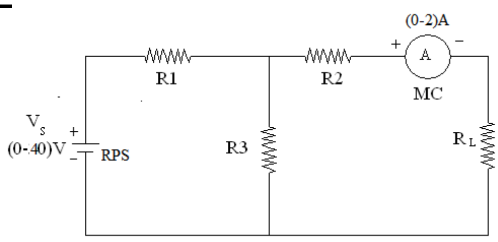
CIRCUIT DIAGRAMS:

FOR THEVINEN'S THEOREM:

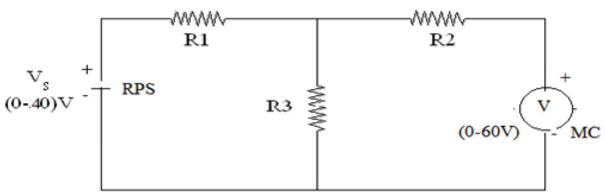


GIVEN NETWORK

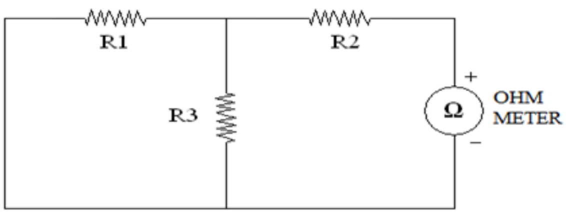
TO FIND IL:-

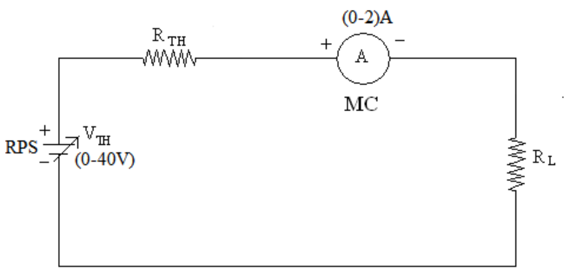


TO FIND Vth:-



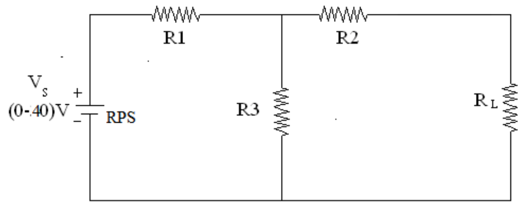
TO FIND Rth:-





FOR NORTON'S THEOREM:

CIRCUIT DIRAGRAMS:



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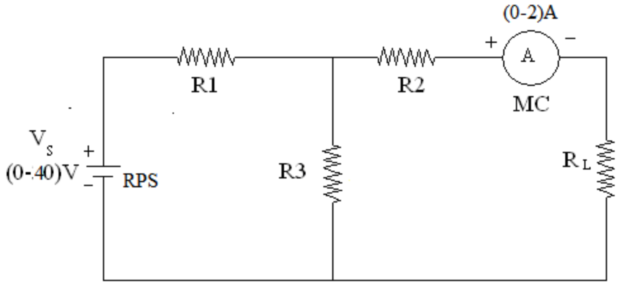
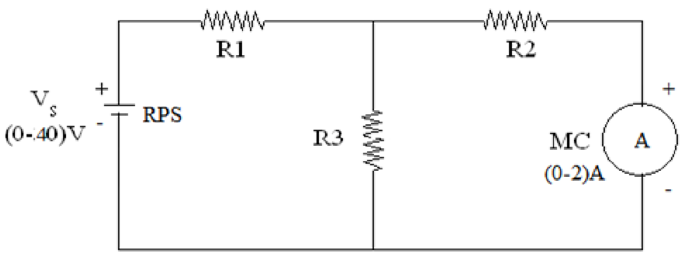
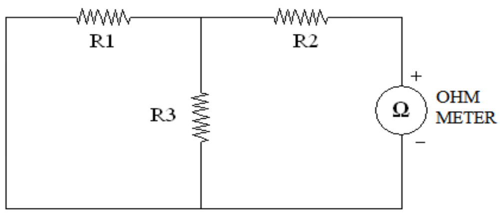
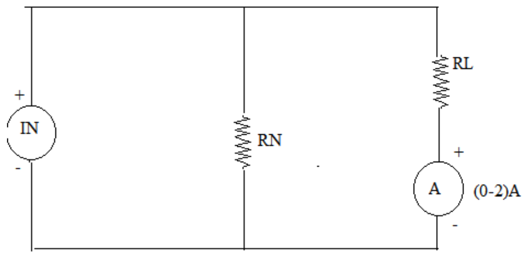


TO FIND IN:-



TO FIND Rth:-





Exp. No. 02 Date:	VERIFICATION OF THEVINEN'S AND NORTON'S THEOREMS

AIM: To verify the current flowing through the load theoretically and experimentally by using Thevinen's and Norton's Theorems.

APPARATUS REQUIRED:

S.No	Name of the Apparatus	Type	Range	Qty.
1 2 3 4 5 6	DC Regulated Power Supply Ammeter Volt Meter Multi Meter Connecting Wires Rheostat	1 Channel MC MC Digital Wound	(0-40) V (0-2)A (0-60)V 150Ω,75Ω,100Ω,100Ω	1 No 1 No 1 No 1 No 1 bunch 1 No.

THEORY: Refer text book by the student

TABULAR FORMS:

From Figure.1

S.No	Vs		Experimentally	Theoretically
1.		I_L flowing through the load resistance in the given network		

From Figure.2

S.No	Vs		Experimentally	Theoretically
1.		Thevinen's voltage $V_{th.}$		

From Figure.3

S.No		Experimentally	Theoretically
1.	Thevinen's Equivalent resistance, Rth		

From Figure.4

S.No	Vs		Experimentally	Theoretically
1.		I_L flowing through the load resistance in the Thevenin's equivalent network		

PROCEDURE FOR THEVINEN'S THEOREM:

1. The circuit is connected as shown in fig 1. The voltage is applied to the circuit from the regulated power supply and load current I_L is noted.
2. The circuit is connected as shown in fig 2. The voltage Vs is applied to the circuit from the RPS and Thevinen's voltage is measured across the voltmeter.
3. The circuit is connected as shown in fig.3. Thevenin's resistance is measured by connecting in the circuit as shown in fig.3
4. The Thevinen's voltage V_{th} is applied to the circuit from the RPS. The load current is I_L flowing through Thevinen's equivalent circuit as shown in the fig.4 is noted.

THEORETICAL CALCULATIONS:

TABULAR FORMS:

From figure.6.

S.No	Vs		Experimentally	Theoretically
1		Short Circuit current I_N		

From Figure.7

S.No		Experimentally	Theoretically
1.	Norton's resistance, R_N		

From Figure.8

S.No	I_N		Experimentally	Theoretically
1		I_L flowing through load resistance in the Norton's equivalent network		

PROCEDURE FOR THE NORTON'S THEOREM:

1. The circuit is connected as shown in fig 5. The voltage Vs is applied to the circuit from the RPS and measure the short circuit current from ammeter is noted. The short circuit current is also called as Norton's current.
2. The circuit is connected as shown in fig 6. Measure the Norton's resistance with the help of multimeter.
3. The circuit is connected as shown in fig 7. Norton's current is circulated through the circuit and load current I_L flowing through Norton's equivalent circuit is noted.

Theoretical Calculations:

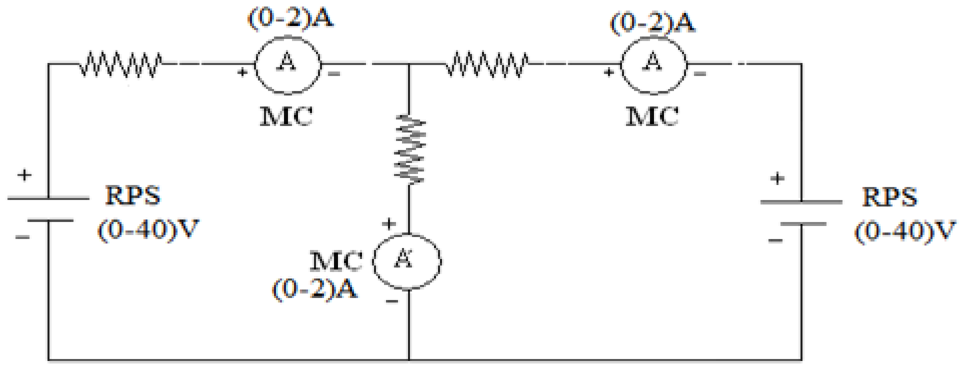
Precautions:

1. All the connections must be tight.
2. The Multimeter should not be connected when the power is ON.
3. The reading must be taken without any parallax error.

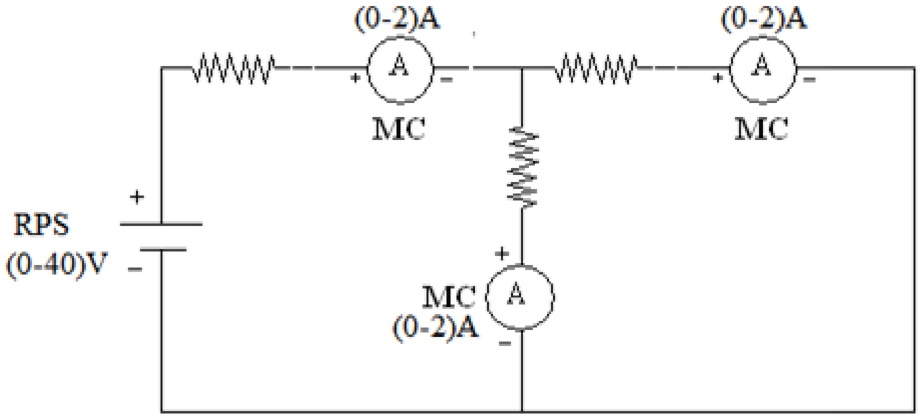
RESULT:

CIRCUIT DIAGRAMS:

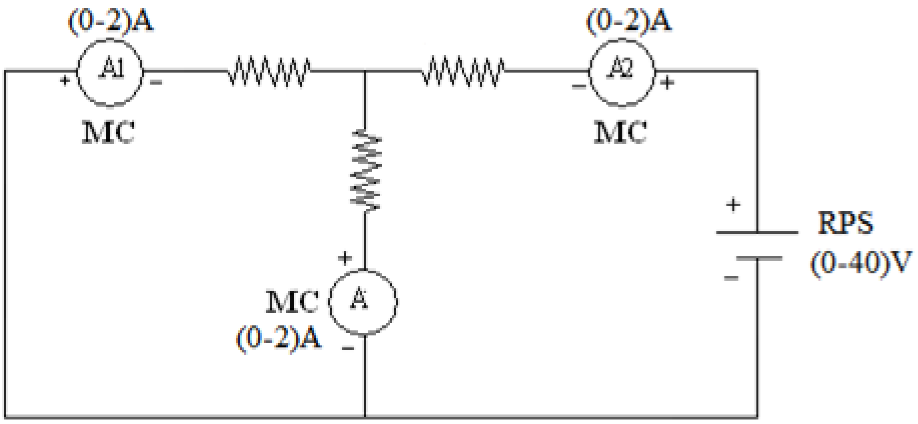
BOTH VOLTAGES ARE IN ACTIVE:-



SINGLE VOLTAGE IS ACTIVE:-



SINGLE VOLTAGE IN ACTIVE:-



Exp. No: 03 Date:	VERIFICATION OF SUPER POSITION THEOREM

AIM: To verify the Super Position Theorem experimentally and theoretically.

APPARATUS REQUIRED:

S.No	Name of the Apparatus	Type	Range	Qty.
1	DC regulated power supply	Dual Channel	(0-40)V	1 No
2	Ammeter	MC	(0-2)A	3 No
3	Connecting Wires			1 Bunch
4	Rheostat	Wound	75Ω,150Ω,150Ω	1 No

THEORY: Refer text book by the student

TABULAR FORMS I:

For fig. 1 of Super Position Theorem
When both the sources are active

S.No	V_1 Volts	V_2 Volts	I_1(A)		I_2(A)		I_3(A)	
			Exp	Theo	Exp	Theo	Exp	Theo
1								

For fig. 2 of Super Position Theorem
When Voltage source V1 alone active

S.No	V_1 Volts	V_2 Volts	I 1		I_2(A)		I_3(A)	
			Exp	Theo	Exp	Theo	Exp	Theo
1								

For fig. 3 of Super Position Theorem
When Voltage source V2 alone active

S.No	V_1 Volts	V_2 Volts	I_1(mA)		I_2(mA)		I_3(mA)	
			Exp	Theo	Exp	Theo	Exp	Theo
1								

PROCEDURE FOR SUPER POSITION THEOREM:

1. The circuit is connected as shown in fig 1. The voltages V_1 and V_2 are applied to the circuit from the regulated power supply. The currents I_1, I_2 and I_3 are noted.
2. The circuit is connected as shown in fig 2. The voltages V_1 alone is applied to the circuit from the regulated power supply to measure the currents I_1', I_2' and I_3' in the ammeters.
3. The circuit is connected as shown in fig 3. The voltage V_2 alone is applied to the circuit from the regulated power supply to measure the currents I_1'', I_2'' and I_3'' in the ammeters.
4. The following relations are verified. $I_1=I_1'-I_1''$, $I_2=I_2'-I_2''$, $I_3= I_3'+I_3''$.
5. The experimental results are compared with theoretical results.

THORETICAL CALCULATIONS:

EXPERIMENTAL CALCULATIONS:

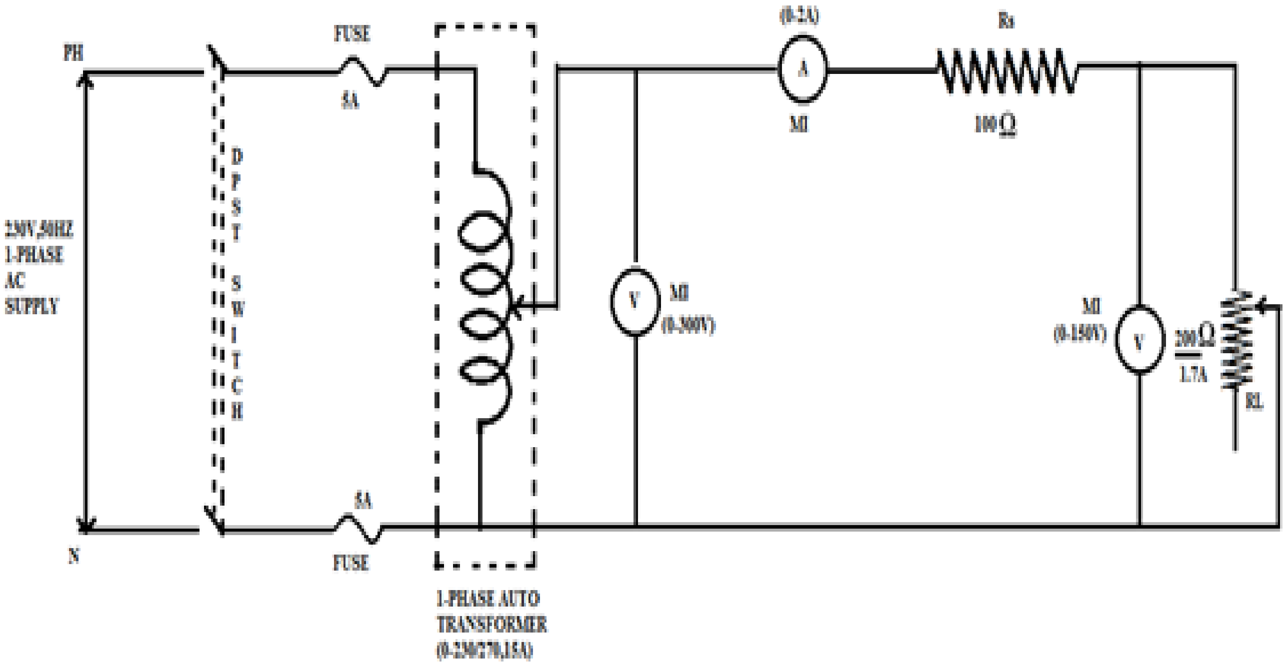
$$I_1 =I_1'-I_1'' \qquad I_2= I_2'-I_2'' \qquad I_3= I_3'+I_3''$$

PRECAUTIONS:

1. All the connections must be tight and readings are taken without parallax error.
2. Before making and breaking the connections, power supply should be switched off.
3. Don’t connect the multi-meter when the power is ON.

RESULT:.

CIRCUIT DIAGRAM:



MAXIMUM POWER TRANSFER CIRCUIT

Exp. No. 04 Date:	VERIFICATION OF MAXIMUM POWER TRANSFER THEOREM WITH DC EXCITATION

AIM: To verify the Maximum Power Transfer Theorem on DC using resistive-load theoretically and experimentally

APPARATUS REQUIRED:

S.No	Name of the experiment	Type	Range	Qty.
1	Regulated Power Supply		(0-30)V	1 No
2	Bread Board			1 No
3	Ammeter	MC	(0-200)mA	1 No
4	Volt Meter	MC	(0-20)V	1 No
5	Connecting Wires			1 Bunch

THEORY: Refer text book by the student

TABULAR FORMS:

With DC excitation using Resistive Load.

S. No	Applied Voltage V in volts.	Load current I_L in mA	Voltages across load V_L in Volts	Load resistance R_L in ohms	Power absorbed by the load $P_L = I^2R$ (watts)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

PROCEDURE:

1. The circuit is connected as shown in figure.
2. DC supply of 20 V is applied to the circuit and by varying the load resistance, the value of load voltage and load current are noted.
3. The resistance is calculated by volt-amp method.
4. By using the values of V_L and I_L power absorbed by the load is calculated.
5. A graph is plotted between power (P) and load resistance (R_L). The RL at which maximum power absorbed is calculated from the graph.

THEORETICAL CALCULATIONS:

The power absorbed by load in the given circuit can be calculated theoretically

$$P = \frac{V}{(R_S+R_L)^2}$$

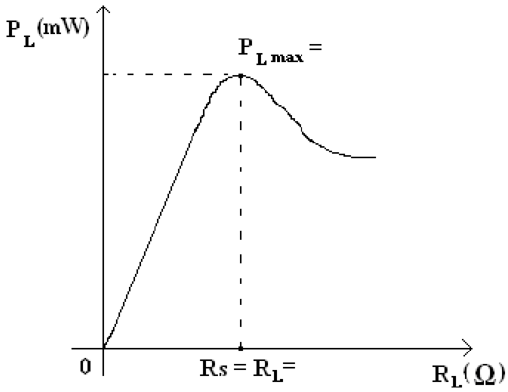
Where,

V= Applied voltage=

R_S= Source Resistance =

R_L= Load Resistance, which may vary from 0 to 500Ω

MODEL GRAPH:

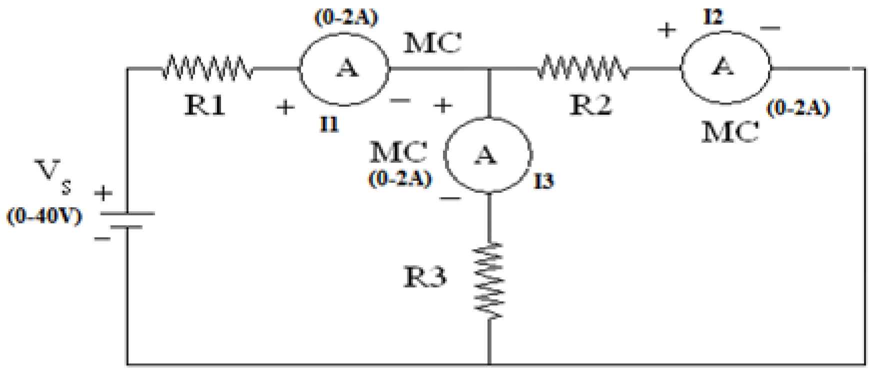


PRECAUTIONS:

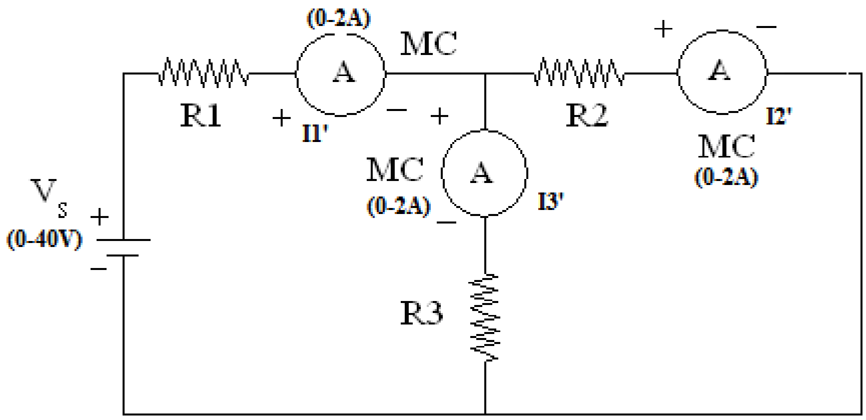
1. All the connections must be tight.
2. Before making and breaking the connections power supply should be switched OFF.
3. Don’t connect the ohmmeter in the circuit when the power is ON.

RESULT:

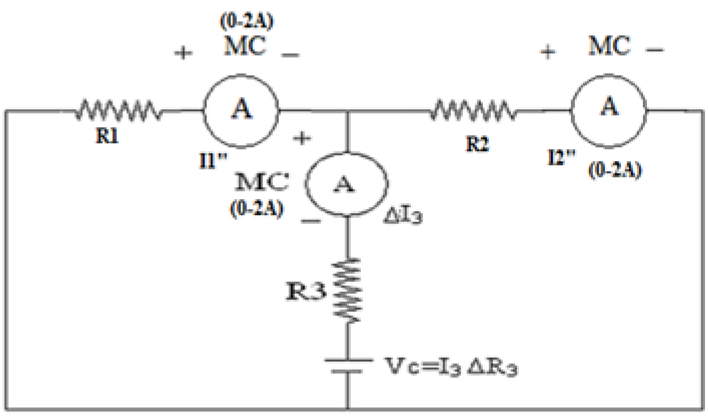
CIRCUIT DIAGRAMS:



TO FIND BRANCH CURRENTS:-



REPLACEMENT WITH Vc =IΔR:-



Exp. No. 5 Date:	VERIFICATION OF COMPENSATION THEOREM

AIM: To verify the Compensation Theorem experimentally and theoretically for the given network using DC excitation.

APPARATUS REQUIRED:

S.No	Name of the Apparatus	Type	Range	Qty.
1	Bread Board			1 No
2	Regulated DC Power Supply	Dual Channel	(0-30)V	1 No
3	Ammeter	MC	(0-200)mA	1 No
4	Volt meter	MC	(0-20)V	1 No
5	Connecting wires			1 bunch

THEORY: Refer text book by the student

TABULAR FORMS:

For fig.1

	Exp	Theo
Branch currents	I_1= I_2= I_3=	I_1= I_2= I_3=

For fig.2

	Exp	Theo
Branch currents	I_1'= I_2'= I_3'=	I_1'= I_2'= I_3'=

For fig3

	Exp	Theo
Compensation Voltage $V_C=I_3\,\Delta R_3$		

For fig4

	Exp	Theo
Branch currents With compensation voltage source	ΔI_1= ΔI_2= ΔI_3=	ΔI_1= ΔI_2= ΔI_3=

PROCEDURE FOR COMPENSATION THEOREM:

1. The circuit is connected as shown in the fig 1.
2. The fixed voltages V in RPS are applied to the circuit. Then all the branch currents I_1, I_2, I_3 are measured and noted.
3. The circuit is connected as shown in fig 2. Fix the new (branch) values of R3 and fixed voltage V is applied to the circuit. All branch currents are measured (I_1’, I_2’, I_3’).
4. The compensation voltage drop V_C is calculated by using the formula
   $\mathbf{V_C = I_3\, \Delta R_3}$.
5. The circuit is connected as shown in fig 3, fixed voltages V is applied to the circuit. All the branch currents are measured and noted.

PRECAUTIONS:

1. All the connections must be taken without parallax error.
2. The multi meter should not be connected when the power is ON.
3. All the connections must be tight and taken the readings without parallax error
4. The multi-meter should not connect when the power is on.

RESULT:

CIRCUIT DIAGRAMS:

FIGURE-1:-

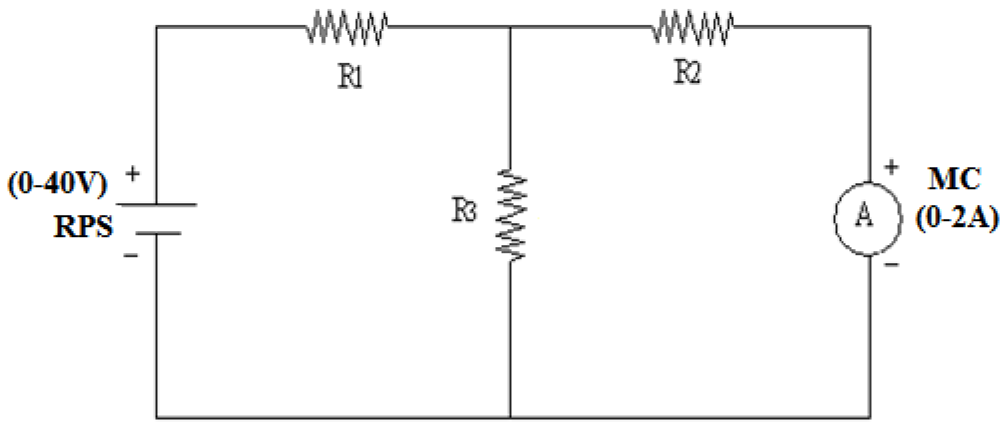
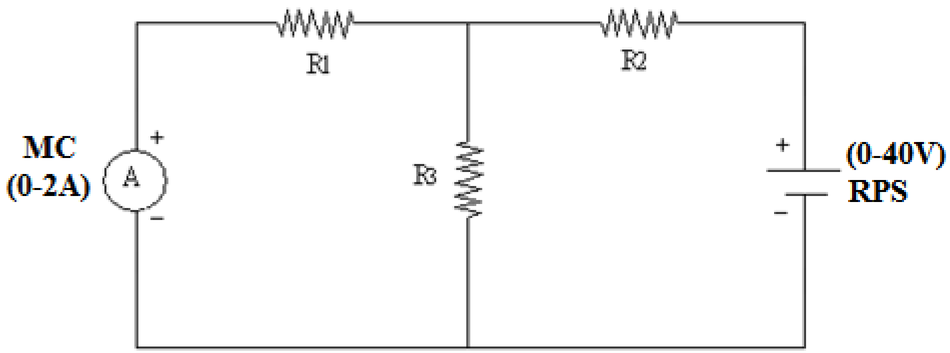


FIGURE-2:-



Exp. No. 06a **Date:**	**VERIFICATION OF RECIPROCITY THEOREM**

AIM: To verify the Reciprocity Theorem experimentally and theoretically.

APPARATUS REQUIRED:

S.No	Name of the Apparatus	Type	Range	Qty.
1	DC regulated power supply	Dual Channel	(0-30)V	1 No
2	Ammeter	MC	(0-200)mA	3 No
3	Connecting Wires			1 Bunch
4	Breadboard			1 No

THEORY: Refer text book by the student

TABULAR FORMS:

For fig. 1 of Reciprocity Theorem

S.No	V (volts)	I_1 (mA)		V/I_1	
		Exp	Theo	Exp	Theo
1.					

For fig. 2 of Reciprocity Theorem

S.No	V (volts)	I_2 (mA)		V/I_2 (mA)	
		Exp	Theo	Exp	Theo
1.					

PROCEDURE:

1. The circuit is connected as shown in fig 1. The voltage V applied from the regulated power supply to measure the current I_1.
2. The circuit is connected as shown in fig 2. The voltage V applied from the regulated power supply to measure the current I_2.
3. The theorem is verified by finding the ratios of V/I_1 and V/I_2.
4. The experimental results are compares with theoretical results.

THORETICAL CALCULATIONS:

PRECAUTIONS:

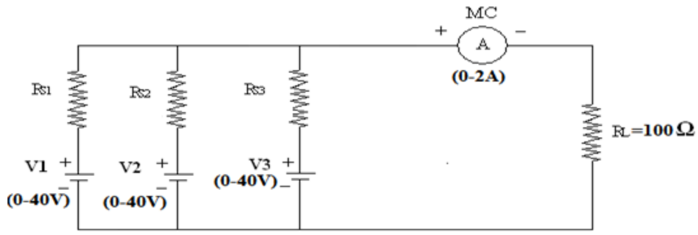
4. All the connections must be tight and readings are taken without parallax error.
5. Before making and breaking the connections, power supply should be switched off.
6. Don’t connect the multi-meter when the power is ON.

RESULT:

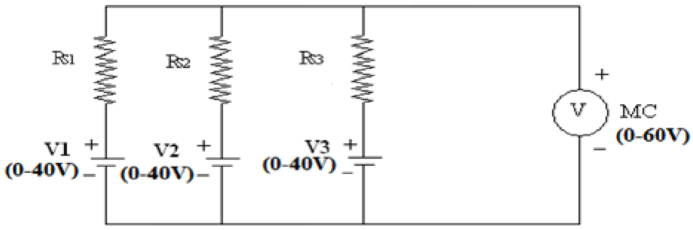
.

CIRCUIT DIAGRAMS:

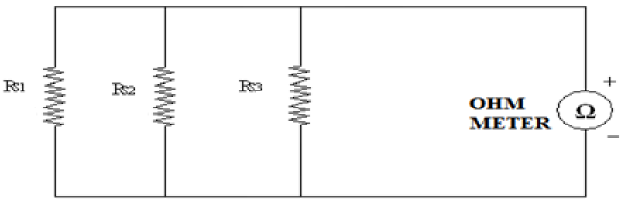
TO FIND IL:-



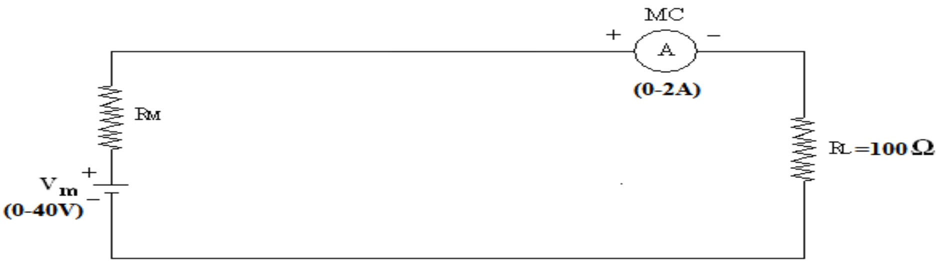
TO FIND Vm:-



TO FIND Rm:-



MILLIMAN'S EQUIVALENT CIRCUIT:-



Exp. No. 06b Date:	VERIFICATION OF MILLMAN'S THEOREM

AIM: To verify the milliman's Theorem experimentally and theoretically for the given excitation system.

APPARATUS REQUIRED:

S.No	Name of the experiment	Type	Range	Qty.
1	Bread Board			1 No
2	Required DC Power Supply	Dual Channel	(0-30)V	1 No
3	Ammeter	MC	(0-200)mA	1 No
4	Volt meter	MC	(0-20)V	1 No
5	Connecting wires			1 bunch

THEORY: Refer text book by the student

TABULAR FORMS:

For fig.1

	Exp	Theo
Load Current I_L(mA)		

For fig.2

	Exp	Theo
Millman's Voltage V_m (Volts)		

For fig.3

	Exp	Theo
Millimans' Resistance R_M(ohms)		

For fig.4

	Exp	Theo
Load Current I_L(mA)		

PROCEDURE FOR MILLMAN'S THEOREM:

1.The circuit is connected as shown in the fig 1.

2. The fixed voltages V_1, V_2, V_3 in the RPS and applied to the circuit. The current flowing through the load resistance is measured and tabulated.
3. For the fixed values of voltages V_1, V_2, V_3 Millman Voltage is measured & tabulated & Millman's resistance is also calculated.
4. The current flowing through the load resistance is measured and tabulated.

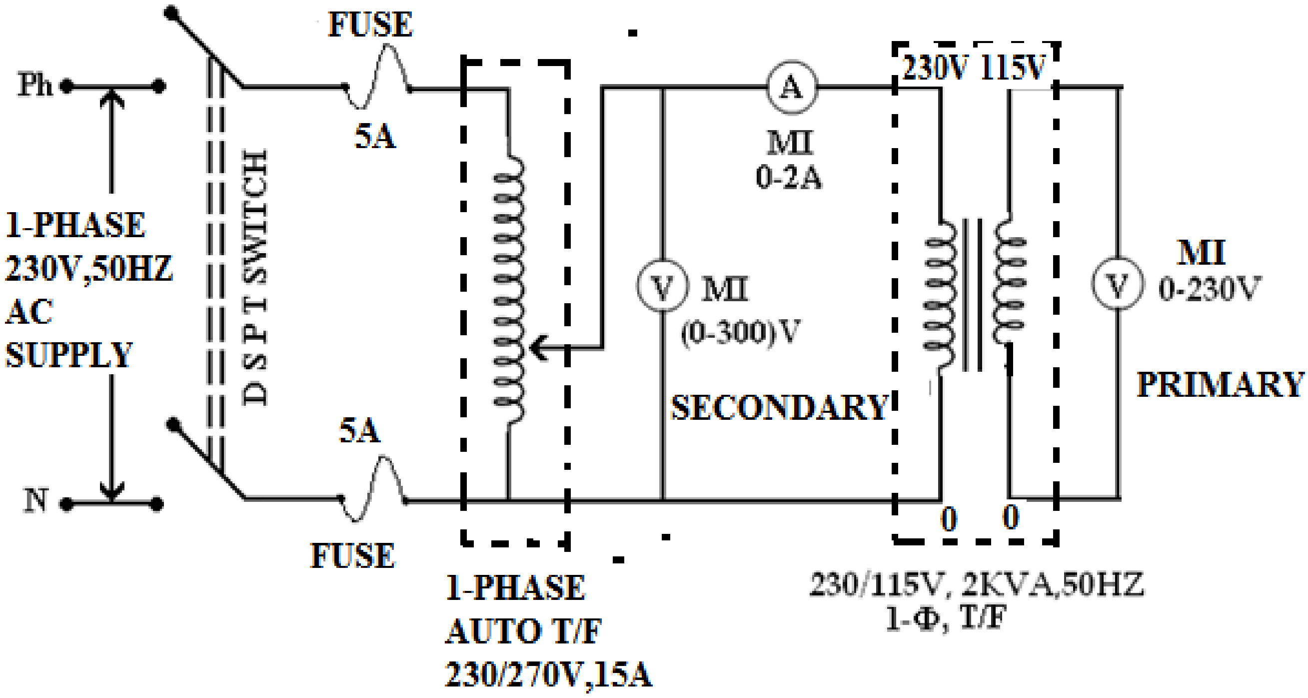
THEORETICAL CALCULATIONS:

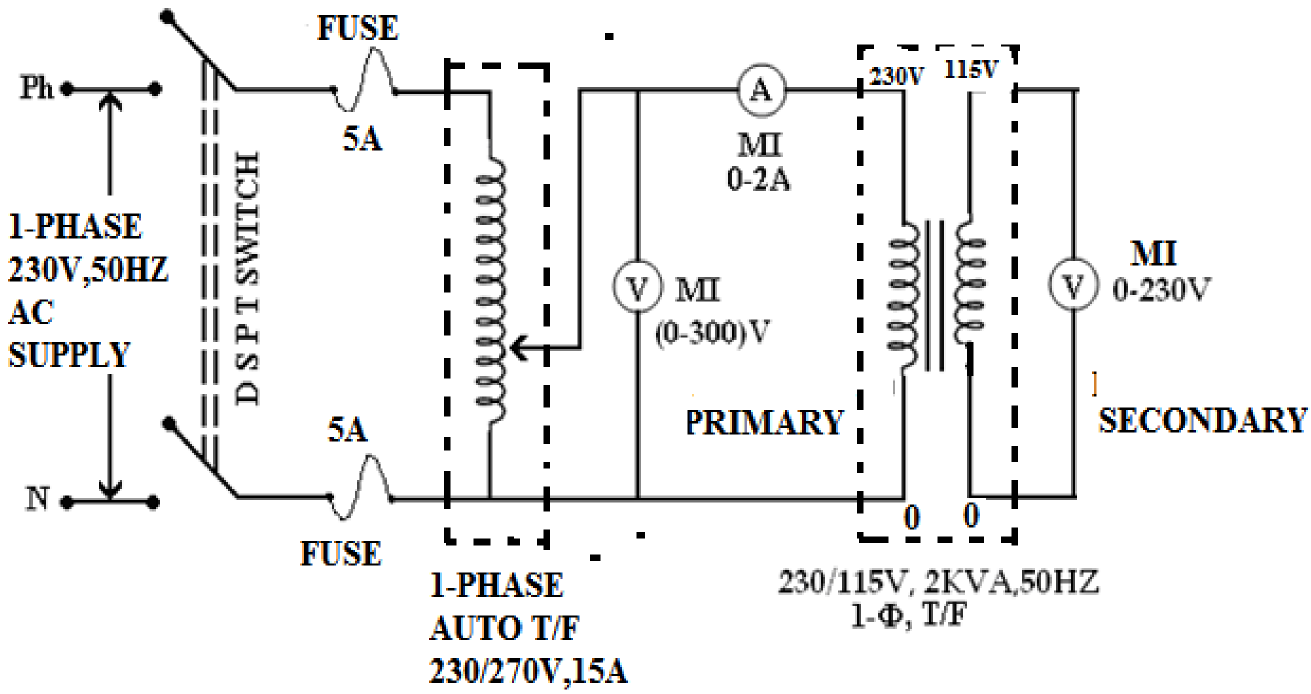
PRECAUTIONS:

1. All the connections must be taken without parallax error.
2. The multi meter should not be connected when the power is ON.
3. All the connections must be tight and taken the readings without parallax error
4. The multi-meter should not connect when the power is on.

RESULT:

CIRCUIT DIAGRAM:





Exp. No. 07 Date:	DETERMINATION OF SELF INDUCTANCE, MUTUAL INDUCTANCE & CO-EFFICIENT OF COUPLING

AIM: To find self inductance, mutual inductance and co-efficient coupling of coupled circuit.

APPARATUS REQUIRED:

S.No	Name of the Apparatus	Type	Range	Qty.
1	1-Ø Transformer		230/115V, 2KVA,50HZ,0.8A	1 No
2	Voltmeter		(0-300)V	2 No's
3	Ammeter	MC	(0-2)A	1 No
4	1-Ø Variac	MC	(0-230)V,0.8A	1 No
5	Connecting wires			1 Bunch

THEORY: Refer text book by the student

TABULAR FORMS:

a) Secondary Open Circuited:

Sl.No	V_1 (Volts)	V_2 (Volts)	I_1 (Amps)	R_1 Ω

a) Primary Open Circuited:

Sl.No	V_1 (Volts)	V_2 (Volts)	I_2 (Amps)	R_2 Ω

PROCEDURE:

1. Connect the Circuit as per the circuit diagram.
2. Measure the values of V_1, I_1 and V_2. Make the secondary open circuited.
3. Find the impedance value $Z_1 = \frac{V_1}{I_1}$.
4. Find the resistance value (R_1) in primary side using Multimeter.
5. Find the value of Reactance.

$$X_{L1} = \sqrt{\left(Z_1^2 - R_1^2\right)}$$

$$L_1 = \frac{X_{L1}}{2\pi f}$$

6. Now give the supply to secondary side by the value and make primary side open circuited.
7. Measure the values of V_2, I_2 and V_1 and find the impedance value.

$$Z_2 = \frac{V_2}{I_2}$$

8. Find the resistance value (R_2) in Secondary side using Multimeter.

9. Find the value of Inductive Reactance.

$$X_{L2} = \sqrt{\left(Z_2^2 - R_2^2\right)}$$

$$L_2 = \frac{X_{L2}}{2\pi f}$$

10. Find the mutual inductance.

$$Z_{m1} = \frac{V_2}{I_1}$$

$$X_{m21} = \sqrt{\left(Z_{m1}^2 - R_2^2\right)}$$

$$M_1 = \frac{X_{m21}}{2\pi f}$$

$$Z_{m2} = \frac{V_1}{I_2}$$

$$X_{m12} = \sqrt{\left(Z_{m2}^2 - R_1^2\right)}$$

$$M_2 = \frac{X_{m12}}{2\pi f}$$

Mutual Inductance is obtained by taking average of M_1 and M_2.

$$M = \frac{M_1 + M_2}{2}$$

11. Find the value of Co-efficient of coupling by using the formulae

$$K = M\sqrt{L_1 L_2}$$

THEORETICAL CALCULATIONS:-

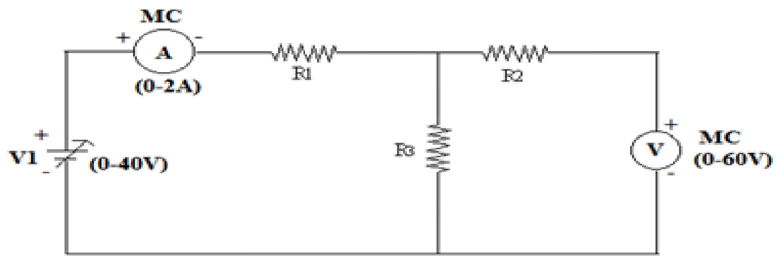
PRECAUTIONS:

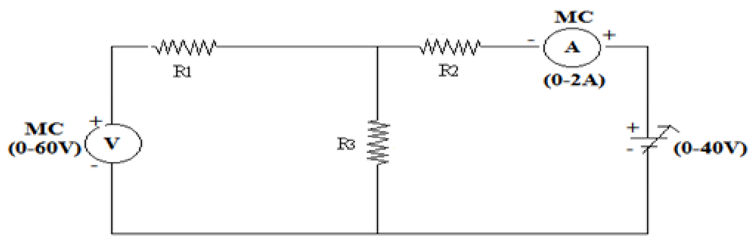
1. Avoid loose connections.
2. Put all meters at initial positions.
3. Take readings without Parallax error.

RESULT:

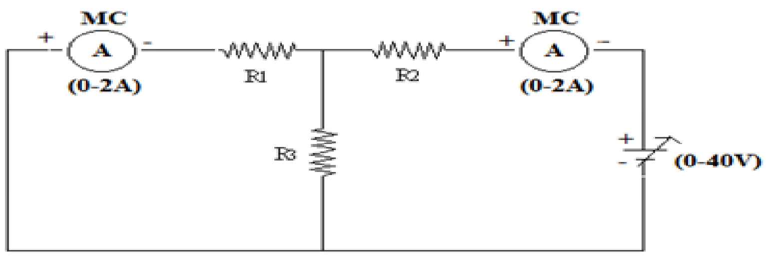
CIRCUIT DIAGRAMS:

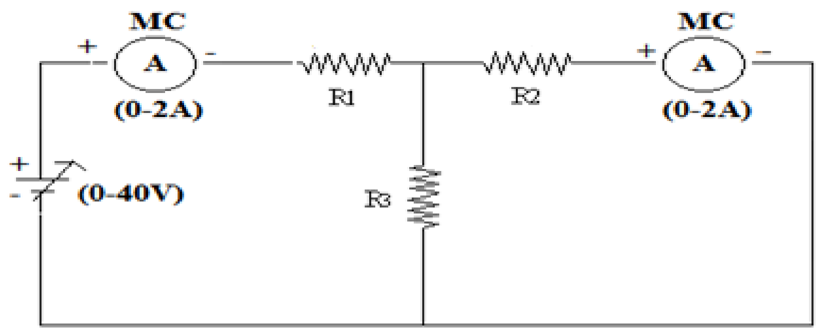
Z-PARAMETERS:





Y-PARAMETERS:





Exp. No. 08 Date:	Z AND Y PARAMETERS

AIM:

To find the Z and Y parameters of a given T network experimentally and theoretically.

APPARATUS REQUIRED:

S.No	Name of the Apparatus	Type	Range	Qty.
1	Bread board			1 No
2	DC Regulated Power Supply	Dual Channel		1 No
3	Volt Meter	MC	(0-30)V	2 No
4	Ammeter	MC	(0-200)mA	2 No
5	Connecting wires			1 Bunch

THEORY: Refer text book by the student

TABULAR FORMS:

Observations For fig.1
When the output port is open circuited i.e. I_2=0

S.No	I/P port Voltage V_1(volts)	V_1 Volts		I_1 (mA)		V_2(volts)	
		Exp	Theo	Exp	Theo	Exp	Theo
1							

Observations For fig.2
When the input port is open circuited i.e. I_1=0

S.No	O/P port Voltage V_2(volts)	V_2 Volts		I_2 (mA)		V_1 (volts)	
		Exp	Theo	Exp	Theo	Exp	Theo
1							

Observations For fig.3
When the output port is short circuited i.e. $V_2=0$

S.No	I/P port Voltage V_1(volts)	V_1 Volts		I_1 (mA)		I_2 (mA)	
		Exp	Theo	Exp	Theo	Exp	Theo
1							

Observations For fig.4
When the input port is short circuited i.e. $V_1=0$

S.No	O/P port Voltage V_2(volts)	V_2 Volts		I_2 (mA)		V_1 (volts)	
		Exp	Theo	Exp	Theo	Exp	Theo
1							

CALCULATIONS:

Network Parameters	Experimentally	Theoretically
Z	$Z_{11}=$ $Z_{12}=$ $Z_{21}=$ $Z_{22}=$	$Z_{11}=$ $Z_{12}=$ $Z_{21}=$ $Z_{22}=$
Y	$Y_{11}=$ $Y_{12}=$ $Y_{21}=$ $Y_{22}=$	$Y_{11}=$ $Y_{12}=$ $Y_{21}=$ $Y_{22}=$

PROCEDURE:

To determine Impedance (Z) parameters:

1. The circuit is connected as shown in the fig 1. D.C supply is applied to the input port (X-XX) & open circuit voltage at the output port (Y-YY) and note down the values of I1 and V_2. From this Z_{11} and Z_{21} can be calculated.

2. The circuit is connected as shown in fig 2. D.C supply is applied to the output port (Y-YY) of the circuit and the open circuit the input port(X-XX) and notes the values of V_1 and I_2 noted. From this Z_{12} and Z_{22} can be calculated.

To determine Admittance(Y) Parameters:

3. The circuit is connected as shown in fig 3. D.C supply is applied to the input port (X-XX) & short circuit output port(Y-YY) and the readings of the V_1 & I_2 are noted. From this Y_{11} and Y_{21} can be calculated.

4. The circuit is connected as shown the fig 4. D.C supply is applied to the output port (Y-YY) & short circuits input port(X-XX) and the readings of the I_1 & I_2 are noted. From this Y_{12} and Y_{22} can be calculated.

THEORETICAL CALCULATIONS:

For Impedance (Z) Parameters:

$$V_1=Z_{11}I_1+Z_{12}I_2$$
$$V_2=Z_{21}I_1+Z_{22}I_2$$

$Z_{11}=V_1/I_1=$
$Z_{12}=V_1/I_2=$
$Z_{21}=V_2/I_1=$
$Z_{22}=V_2/I_2=$

For Admittance(Y) Parameters:

$$I_1=Y_{11}V_1+Y_{21}V_2$$
$$I_2=Y_{21}V_1+Y_{22}V_2$$

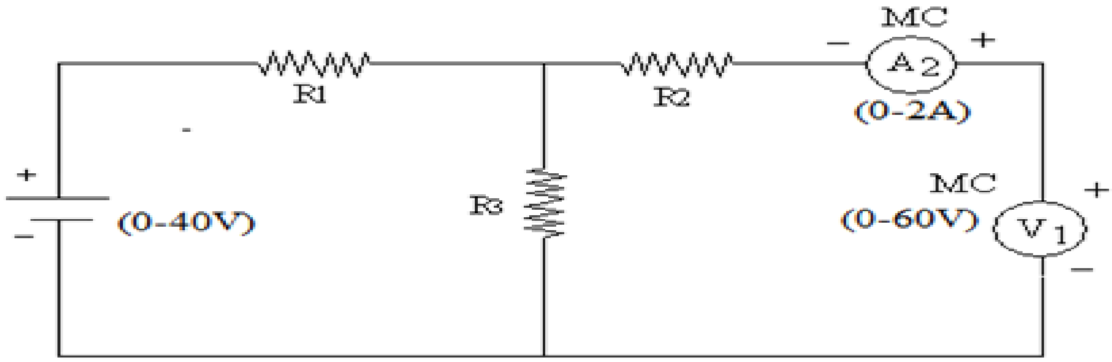
$Y_{11}=I_1/V_1=$
$Y_{12}=I_1/V_2=$
$Y_{21}=I_2/V_1=$
$Y_{22}=I_2/V_2=$

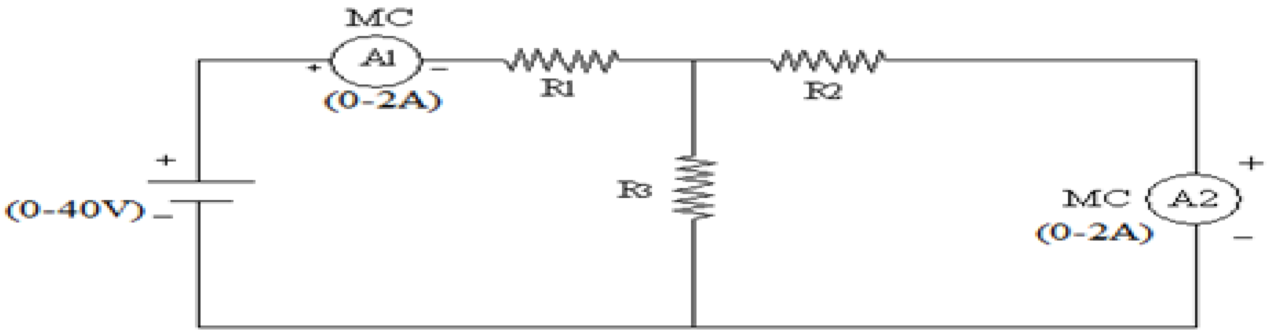
PRECAUTIONS:

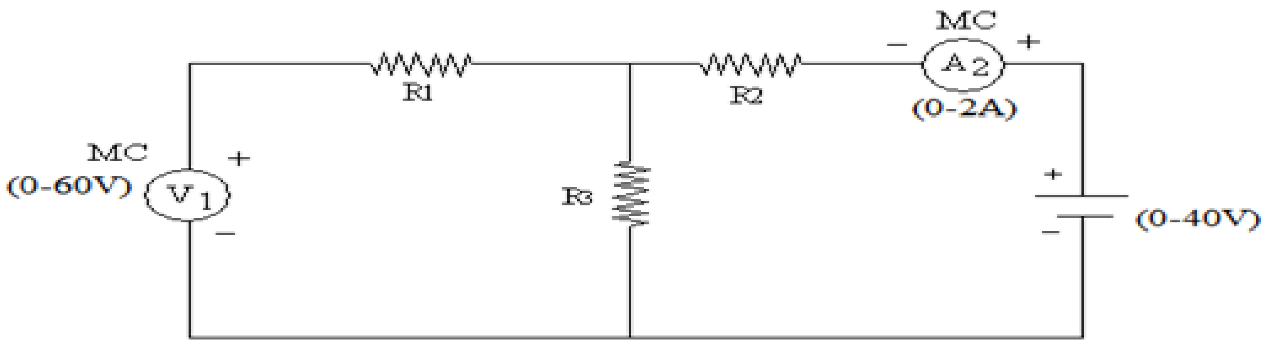
1. All the connections must be tight and the readings are measured without parallax error.
2. Before making and breaking the connections power supply should be switched off

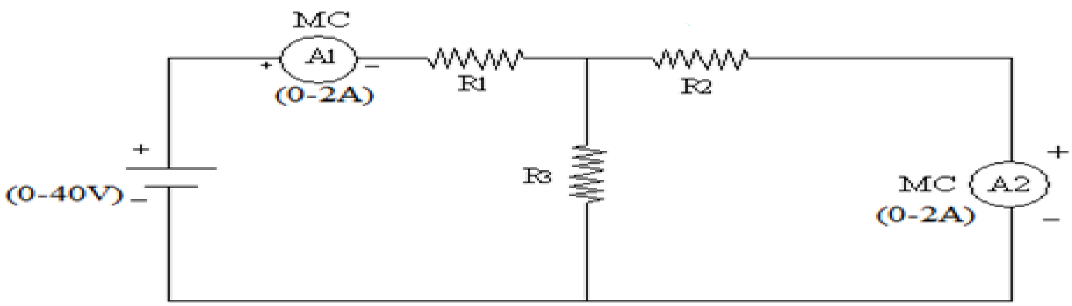
RESULT:

CIRCUIT DIAGRAM:









Exp. No. 09 Date:	TRANSMISSION AND HYBRID PARAMETERS

AIM: To find the Transmission and Hybrid parameters of a given T network experimentally and theoretically.

APPARATUS REUIRED:

S.No	Name of the Apparatus	Type	Range	Qty.
1	Bread board			1 No
2	DC Regulated Power Supply	Dual Channel		1 No
3	Volt Meter	MC	(0-30)V	2 No
4	Ammeter	MC	(0-200)mA	2 No
5	Connecting wires			1 Bunch

THEORY: Refer text book by the student

TABULAR FORMS:

Observations For fig.1
When the output port is open circuited i.e. I_2=0

S.No	I/P port Voltage V_1(volts)	V_1 Volts		I_1 (mA)		V_2(volts)	
		Exp	Theo	Exp	Theo	Exp	Theo
1							

Observations For fig.2
When the output port is short circuited i.e. V_2=0

S.No	I/P port Voltage V_1(volts)	V_1 Volts		I_1 (mA)		I_2 (mA)	
		Exp	Theo	Exp	Theo	Exp	Theo
1							

Observations For fig.3
When the input port is open circuited i.e. $I_1=0$

S.No	O/P port Voltage V_2(volts)	V_2 Volts		I_2 (mA)		V_1 (volts)	
		Exp	Theo	Exp	Theo	Exp	Theo
1							

Observations For fig.4
When the input port is short circuited i.e. $V_1=0$

S.No	O/P port Voltage V_2(volts)	V_2 Volts		I_2 (mA)		V_1 (volts)	
		Exp	Theo	Exp	Theo	Exp	Theo
1							

CALCULATIONS:

Network Parameters	Experimentally	Theoretically
T	A= B= C= D=	A= B= C= D=
H	h11= h12= h21= h22=	h11= h12= h21= h22=

PROCEDURE:

To determine Transmission (T) parameters:

1. The circuit is connected as shown in the fig 1. D.C supply is applied to the input port (X-XX) & open circuit at the output port (Y-YY) and note down the values of I_1 and V_2. From this A and C can be calculated.

2. The circuit is connected as shown in fig 2. D.C supply is applied to the input port (X-XX) of the circuit and the short circuit the output port(Y-YY) and notes the values of I_1 and I_2 noted. From this B and D can be calculated.

To determine Hybrid (H) Parameters:

3. The circuit is connected as shown in fig 3. D.C supply is applied to the output port (Y-YY) & open circuit input port(X-XX) and the readings of the V_1 & I_2 are noted. From this h_{11} and h_{21} can be calculated.
4. The circuit is connected as shown the fig4. D.C supply is applied to the output port (Y-YY) & short circuits input port(X-XX) and the readings of the I_1 & I_2 are noted. From this h_{12} and h_{22} can be calculated.

THEORETICAL CALCULATIONS:

Transmission parameters:

$$V_1=AV_2+BI_2$$
$$I_1=CV2+DI2$$

$A=V_1/V_2=$
$B=V_1/I_2=$
$C=I_1/V_2=$
$D=I_1/I_2=$

Hybrid Parameters:

$$V_1=h_{11}I_1+h_{12}V_2$$
$$I2=h_{21}I_1+h_{22}V_2$$

$h_{11}=V_1/I_1$
$h_{12}=V_1/V_2$
$h_{21}=I_2/I_1$
$h_{22}=I_2/V_2$

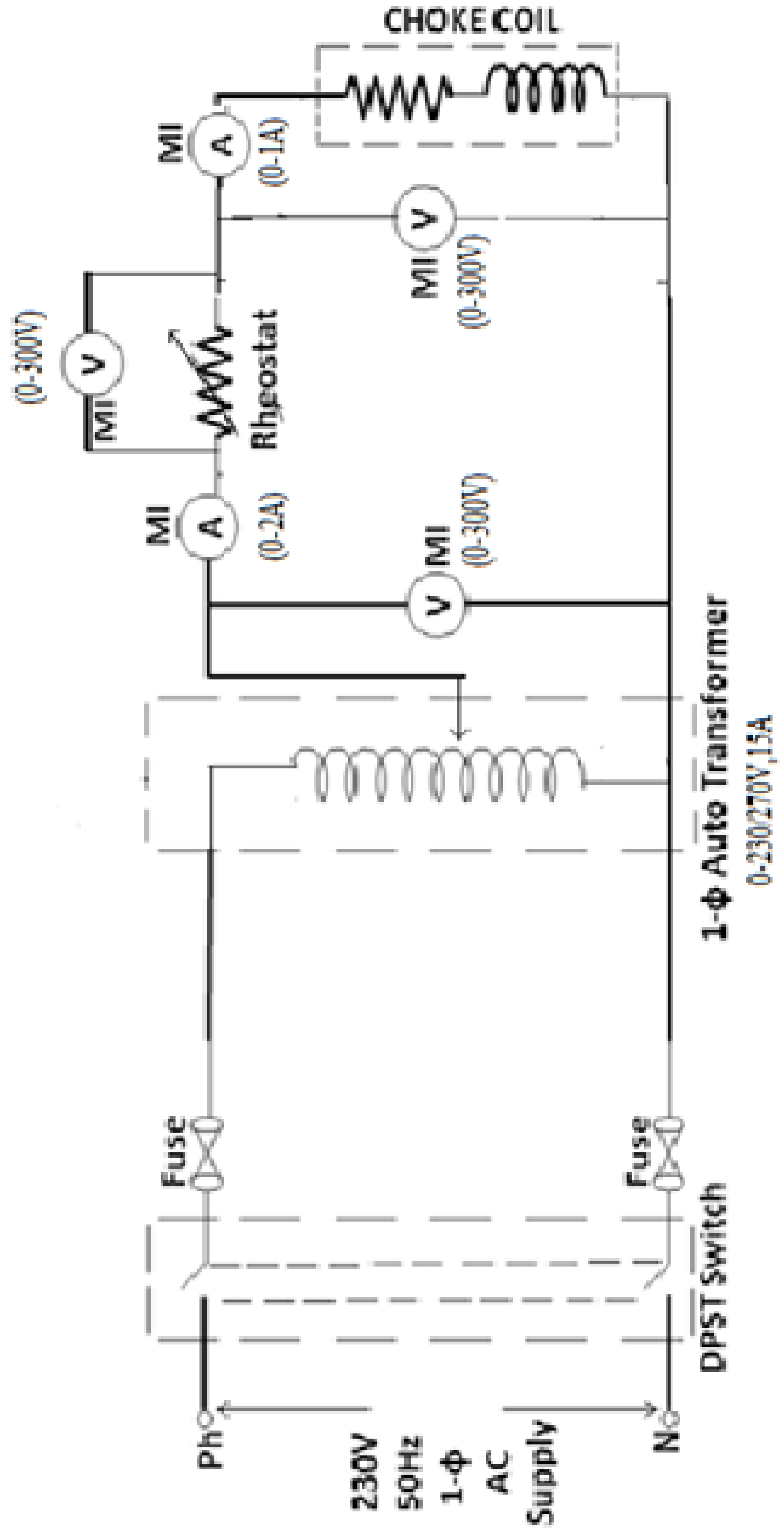
PRECAUTIONS:

1.All the connections must be tight and the readings are measured without parallax error.

2. Before making and breaking the connections power supply should be switched off

RESULT:

Circuit Diagrams:



Exp no:	MEASUREMENT OF PARAMETERS OF A CHOKE COIL

Aim: To measure the parameters of the choke coil using 3-voltmeter method

Apparatus Required:

S. No	Name of the Apparatus	Type	Range	Quantity
1 2 3 4 5 6	AUTO TRANSFORMER Voltmeter Ammeter Choke coil Rheostat. Connecting wires	VARIAC MI MI -- -- --	(0-230/270V,15A) (0-300)v (0-2)A -- (0-360)A --	1 No 3 No 1 No 1 No 1 No 1 bunch

THEORY: Refer text book by the student

TABULAR FORMS:

Observation cum Calculation table for 3 – Voltmeter method:

S. No	V1	V2	V3	P= $(V_1^2 - V_2^2 - V_3^2)/2R$	CosΦ= $(V1^2 - V2^2 - V3^2)/2V2V3$	SinΦ	I= V2/R	Z= V3/I	R= ZcosΦ	X_L= ZsinΦ	L= $X_L/2\Pi f$

Average Inductance = Average Resistance =

Procedure:

1. Connections are made as per the circuit diagram.
2. Observe the VR,V and VL for the given record these in observation table.
3. Change the load resistance R measure in observation table and record its value in the observation table.
4. Calculate the value of R and record in observation table.
5. Take another set of the calculation of VR,V,VL calculate the power and power factor and tabulate these in observation table.
6. Take at least 3sets of observations of the different values of R calculate power, impedance, resistance and inductance.

Model Calculations:

Calculations for 3-Voltmeter method:

Supply voltage = V_1

Voltage across standard resistance R = V_2

Voltage across choke coil = V_3

Power consumed by the choke coil P = $(V_1^2 - V_2^2 - V_3^2)/ 2R$

Power factor of the choke coil Cosϕ = $(V_1^2 - V_2^2 - V_3^2) / 2V_2V_3$

Current flowing through the choke coil I = V_2/ R

Impedance of the coil (Z) = V_3/ I

Resistance of the coil (R) = Z Cosϕ

Reactance of the coil (X) = Z Sinϕ

Induction of the coil (L) = X/2Π

Precautions:

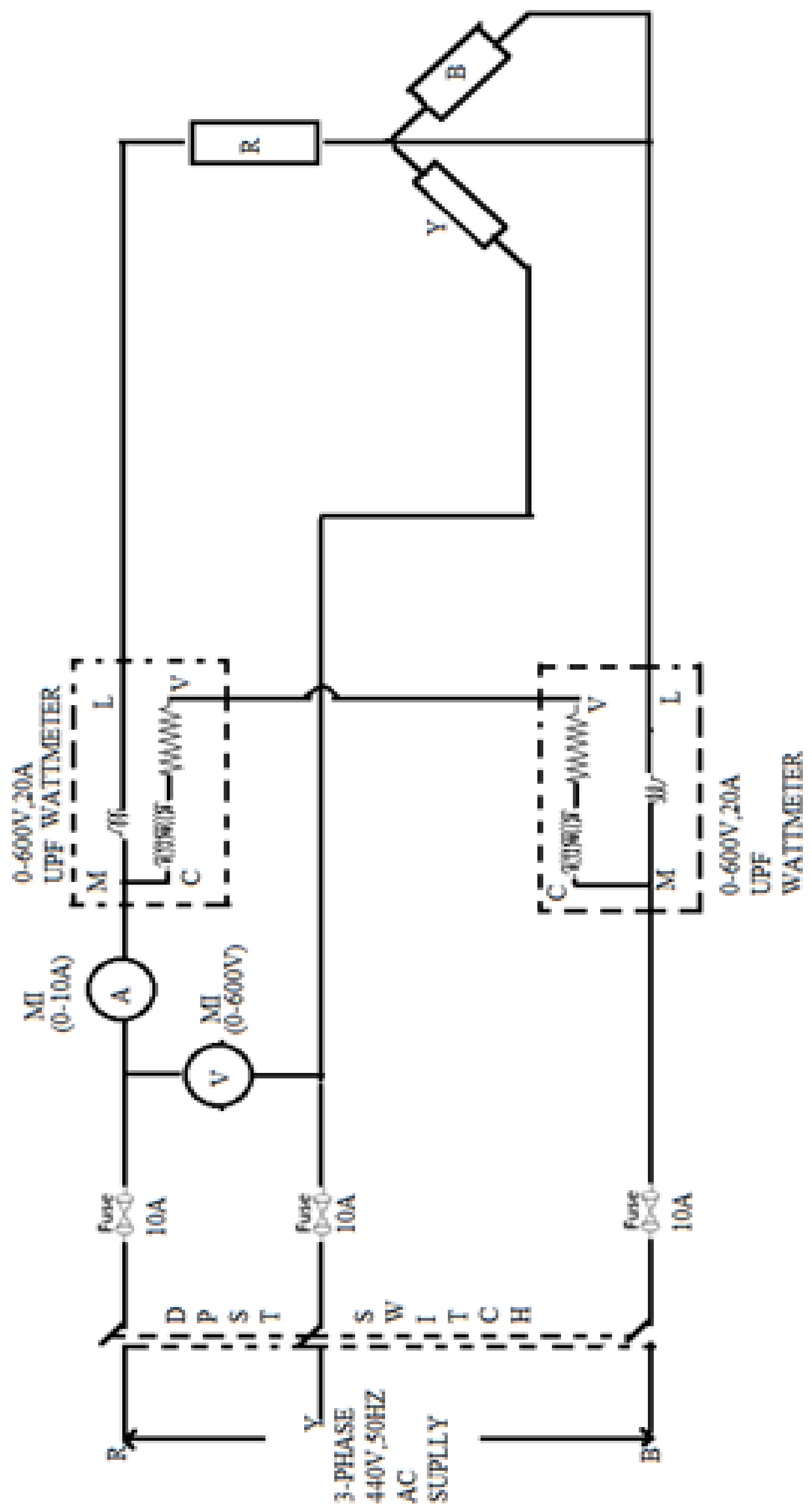
1. Avoid the loose connections readings are taken without parallax error**.**

Result:

Viva-Voce:

1. What is inductance?
2. What is formula for inductive reactance?
3. What is formula for capacitive reactance?
4. What is capacitance?
5. What is rating of dimmer stat?
6. What is meant by choke coil?
7. What is the difference between MC & MI instruments?
8. What is resistance?
9. What is meant by power factor?
10. What is power?

Circuit Diagrams:



Exp. No. 10 Date:	MEASUREMENT OF 3-Φ POWER BY TWO WATTMETER METHOD FOR BALANCED AND UNBALANCED LOADS

AIM: To measure 3-phase power by two wattmeter method for balanced and unbalanced loads.

APPARATUS REUIRED:

S.No	Name of the Apparatus	Type	Range	Qty.
1	Voltmeter	MI	(0-600)V	1 No
2	Ammeter	MI	(0-10)A	1 No
3	Wattmeter	UPF	600V/20A	1 No
4	Reactive Load	Capacitive/Inductive	--	1 No
5	Fuses	Lead Alloy		As Required

THEORY: Refer text book by the student

PROCEDURE:

1. Circuit is connected as per circuit digram.
2. Load is connected to 3-Φ supply through 2 wattmeter's.
3. By closing the TPST switch, equal loads are applied for balanced loads and unequal loads are applied for unbalanced loads in each phase and corresponding values of current, voltage, wattmeter's are noted.
4. Using the above values total power and power factor for both balanced and unbalanced loads are calculated.

CALCULATIONS:

Observation Tables:

S.No	Load	V	I	W_1	W_2	Total Power	Φ	Cos Φ
1								
2								
3								
4								
5								
6								
7								
8								

Observation Tables:

S.No	Load	V	I	W_1	W_2	Total Power	Φ	Cos Φ
1								
2								
3								
4								
5								
6								
7								
8								

PRECAUTIONS:

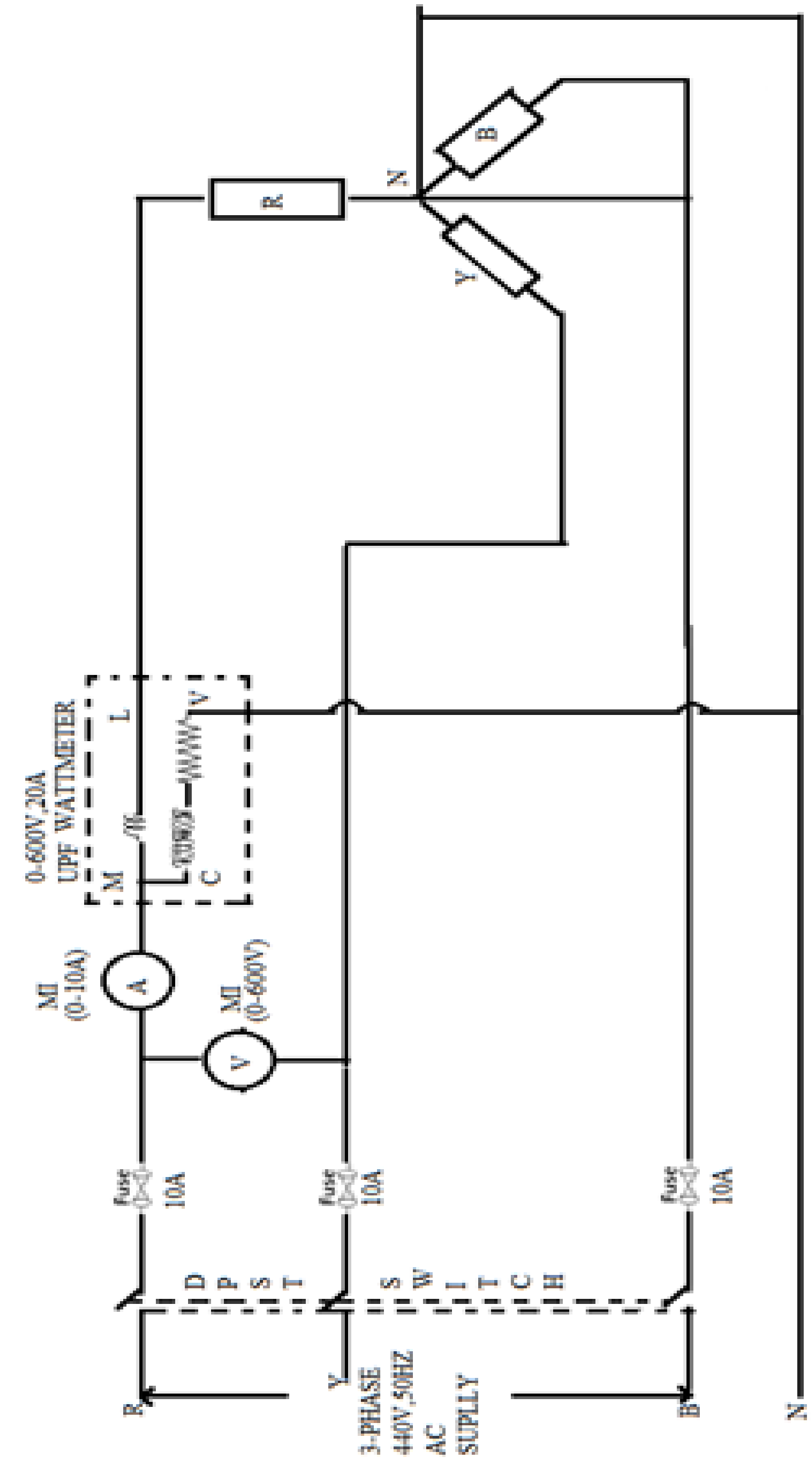
3. It is observed that all connections must be tight.

2. It is observed that while giving the supply to the circuit, load is in off condition.

RESULT:

ADDITIONAL EXPERIMENTS

Circuit Diagrams:



Exp. No. 01	**MEASUREMENT OF ACTIVE POWER FOR START CONNECTED BALANCED LOADS**

Date:	

AIM: To measure the active power for start-delta connected balanced loads.

APPARATUS REQUIRED:

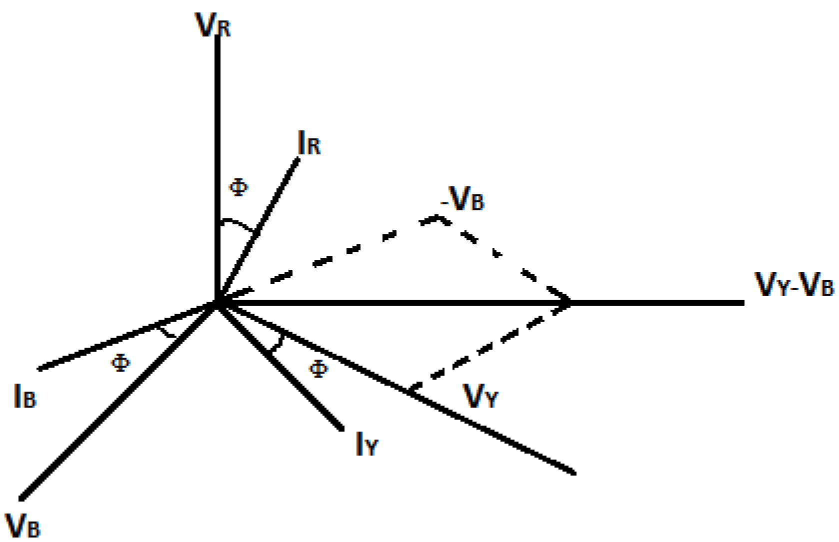
S.No	Name of the Apparatus	Type	Range	Qty.
1	Voltmeter	MI	(0-600)V	1 No
2	Ammeter	MI	(0-10)A	1 No
3	Wattmeter	UPF	600V/20A	1 No
4	Reactive Load	Capacitive/Inductive		1 No
5	Fuses	Lead Alloy		As Required

THEORY: Refer text book by the student

PROCEDURE:

1. Circuit is connected as per circuit diagram.
2. Load is connected to 3Φ supply through 1Φ wettmeter.
3. By closing the TPST switch, load is applied in steps and corresponding readings are noted up to the rated current.
4. Using the above readings 3Φ active power is calculated.

PHASOR DIAGRAM:



OBSERVATIONS:

S.No	Voltage(volts)	Current(amps)	Power(watts)
1			

2 3 4 5			

PRECAUTIONS:

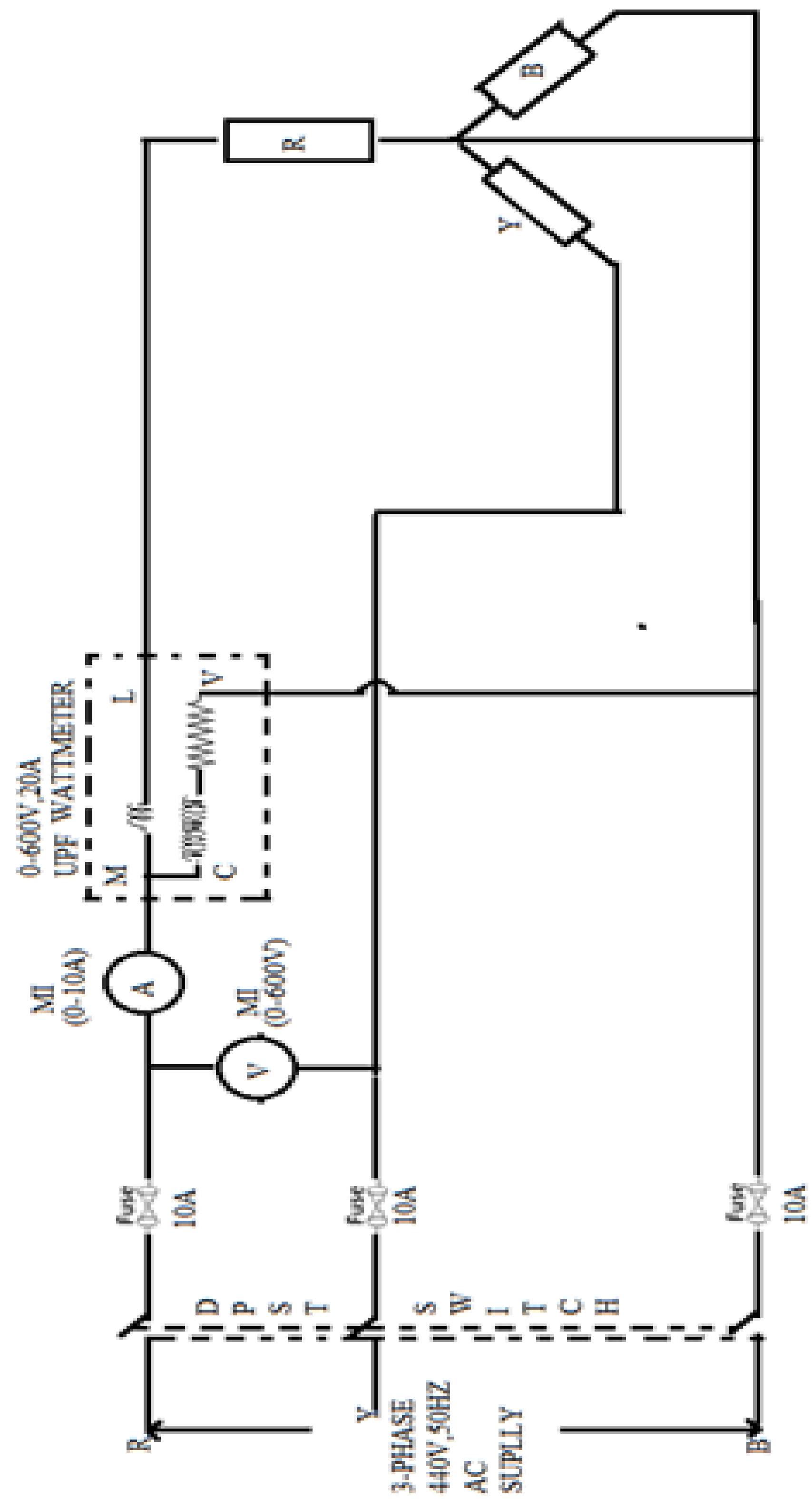
1. It is observed that all connections must be tight.
2. It is observed that while giving the supply to the circuit, load is in off condition.

VECTOR DIAGRAM:

1. Voltage across pressure coil of wattmeter=V_{YB}
2. Current through of current coil of wattmeter=I_R
3. Phase angle difference between PC & CC =90-Φ
4. Reactive power measured by wattmeter W=VI SinΦ
5. 3Φ reactive power=√3*wattmeter reading

RESULT:

Circuit Diagrams:



Exp. No. 02 Date:	**MEASUREMENT OF REACTIVE POWER FOR START CONNECTED BALANCED LOADS**

AIM: To measure the reactive power for start and delta connected balanced loads.

APPARATUS REQUIRED:

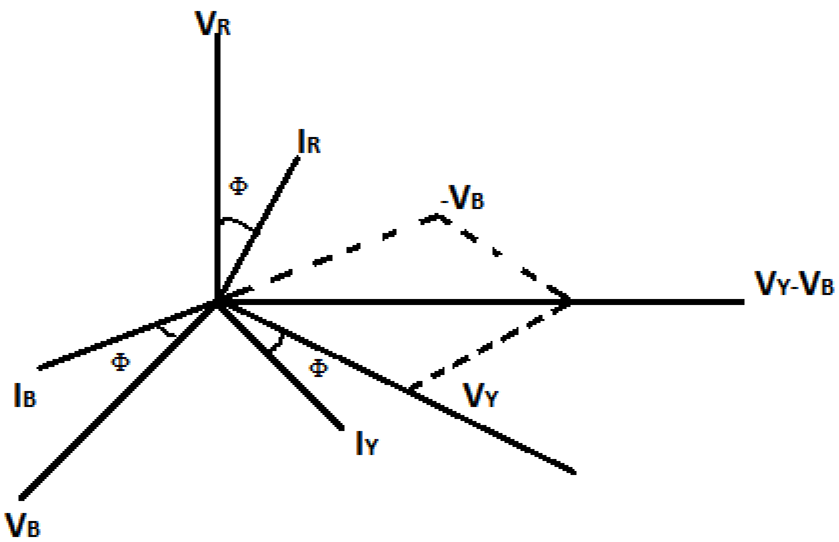
S.No	Name of the Apparatus	Type	Range	Qty.
1	Voltmeter	MI	(0-600)V	1 No
2	Ammeter	MI	(0-10)A	1 No
3	Wattmeter	UPF	600V/20A	1 No
4	Reactive Load	Capacitive/Inductive		1 No
5	Fuses	Lead Alloy		As Required

THEORY: Refer text book by the student

PROCEDURE:

5. Circuit is connected as per circuit diagram.
6. Load is connected to 3Φ supply through 1Φ wettmeter.
7. By closing the TPST switch, load is applied in steps and corresponding readings are noted up to the rated current.
4. Using the above readings 3Φ active power is calculated.

PHASOR DIAGRAM:



OBSERVATIONS:

S.No	Voltage(volts)	Current(amps)	Power(watts)
1			
2			

3			
4			
5			

PRECAUTIONS:

1. It is observed that all connections must be tight.
2. It is observed that while giving the supply to the circuit, load is in off condition.

VECTOR DIAGRAM:

1. Voltage across pressure coil of wattmeter=V_{YB}
2. Current through of current coil of wattmeter=I_R
3. Phase angle difference between PC & CC =90-Φ
4. Reactive power measured by wattmeter W=VI SinΦ
5. 3Φ reactive power=√3*wattmeter reading

RESULT: